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Cestodes in Four Species of Euryhaline Stingrays from Colombia[1]

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ABSTRACT: Seven species of cestodes are reported from coastal stingrays in the vicinity of Cartagena, Colombia. *Acanthobothrium colombianum* sp.n. from *Aetobatis narinari* resembles *A. paulum* and *A. mathiasi* but differs by having relatively shorter, more squared proglottids at the end of the strobila, a pre-equatorial genital pore, relatively less elongate ovarian lobes in terminal proglottids, and less prominent apical suckers and pads. *Acanthobothrium urotrygoni* sp.n. from *Urotrygon venezuelae* most closely resembles *A. olseni* in bothridial hook length but differs in cirrus sac size, resembles *A. southwelli* in cirrus sac size but differs in bothridial hook length, and differs from the former two and resembles *A. lineatum* by having a long and spinose cephalic peduncle; the new species differs from *A. lineatum* by possessing smaller bothridial hooks and cirrus sacs. *Acanthobothrium cartagenensis* sp.n. from *Urolophus jamaicensis* most closely resembles *A. urolophi* but differs in bothridial hook length, length of cirrus sac, number of testes and proglottids, and position of genital pore. *Rhinebothrium magniphallum* infected the new hosts *Urolophus jamaicensis, Urotrygon venezuelae,* and *Dasyatis americana* in the new locality of Cartagena, Colombia. *Phyllobothrium* cf. *kingae* occurred in *Dasyatis americana* and *Urolophus jamaicensis*. *Polypocephalus medusius* and *Lecanicephalum peltatum* infected the new host *Dasyatis americana*. Cartagena is a new locality for both cestode species. A host-parasite checklist for cestodes collected from 121 stingrays examined in Colombia during 1975 and 1976 is presented.

This report is the sixth in a series detailing the cestodes collected from 121 stingrays examined during 1975 and 1976 in the Republic of Colombia (Brooks and Thorson, 1976; Brooks, 1977; Brooks and Mayes, 1978; Mayes et al., 1978; Brooks et al., in press). Herein we report cestodes infecting *Aetobatis narinari* (Euphrasen), *Urotrygon venezuelae* Schultz, *Urolophus jamaicensis* (Cuvier), and *Dasyatis americana* Hildebrand and Schroeder; additionally, we present a checklist of hosts examined and cestodes collected (Table 1).

Helminths were removed from hosts and fixed with gentle heat and AFA or fixed *in situ* with 10% formalin. They were stained with Mayer's or Ehrlich's hematoxylin and mounted in Histoclad or Canada balsam for study as whole mounts. Serial cross sections cut at 8 μm and stained with hematoxylin-eosin were used to confirm some aspects of proglottid morphology. Mean values ($\bar{x}$) and sample size (N) are listed for certain meristic characters. Figures were drawn with the aid of a drawing tube; all measurements are in μm unless otherwise stated.

Acanthobothrium colombianum sp.n. (Figs. 1–3)

DESCRIPTION (based on 3 specimens): Strobila craspedote, apolytic, up to 35 mm long, composed of 31–48 proglottids. Scolex 230–276 long by 230 wide, com-

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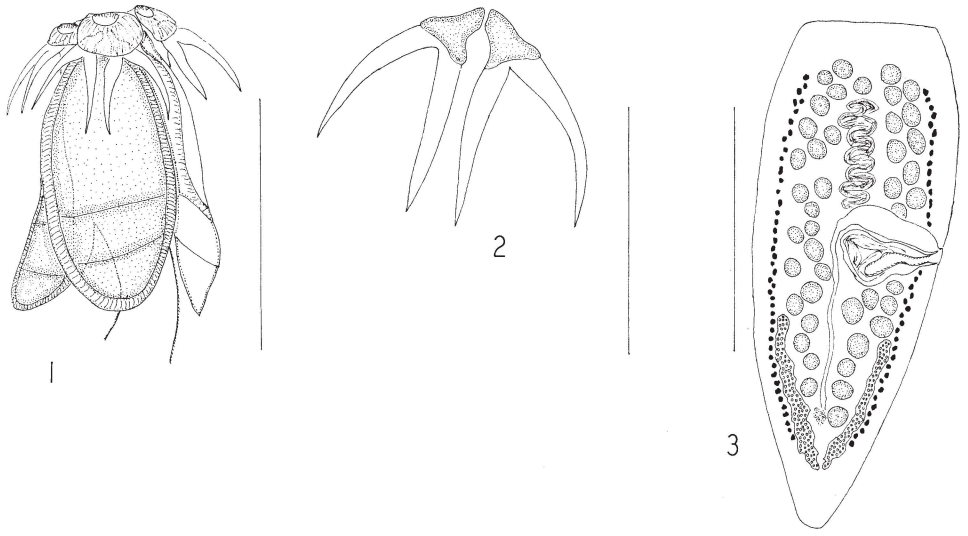


Figures 1–3. ***Acanthobothrium colombianum.*** **1. Scolex. 2. Bothridial hooks. 3. Mature proglottid. Scale for Figure 1 = 400 μm; for Figure 2 = 200 μm; for Figure 3 = 400 μm.**

posed of 4 trilocular bothridia each armed with pair of bifid hooks and surmounted by apical sucker and pad. Bothridia 299–391 long by 115–161 wide; anterior loculus 200–230 long, middle loculus 39–50 long, posterior loculus 39–50 long. Ratio of locular lengths 1:0.2:0.2. Apical pad 90–100 in diameter, suckers 45–54 in diameter. Hook formula (modified from Euzet, 1956, to include mean values) for 12 hooks:

$$\frac{48\text{–}53\ (50) \qquad 120\text{–}146\ (132) \qquad 131\text{–}150\ (140)}{175\text{–}193\ (185)}$$

Cephalic peduncle 805–989 long, spinose; spines 5–7 long. Immature proglottids wider than long. Mature proglottids 667–690 long by 230–306 wide. Genital pores alternating irregularly in anterior 40–46% ($\bar{x}$ = 43%, N = 15) of proglottid. Cirrus sac 150–195 long by 75–143 wide, containing spined eversible cirrus. Testes in anterior ¾ of proglottid, 30–45 in diameter, 39–53 ($\bar{x}$ = 46.2, N = 15) in number; 11–14 (13) preporally, 6–10 (8) postporally, 21–29 (25) antiporally. Ovary H-shaped with equal-length lobes not reaching anteriorly to posterior margin of cirrus sac; lobes 150–270 long by 90–135 wide at isthmus. Vitelline follicles 5–30 in diameter, extending along lateral portions of proglottid from ovarian isthmus to near anterior end.

HOST: *Aetobatis narinari* (Euphrasen).

SITE OF INFECTION: Spiral valve.

LOCALITY: Cartagena, Colombia.

HOLOTYPE: USNM Helm. Coll. No. 75160.

PARATYPES: USNM Helm. Coll. No. 75161.

ETYMOLOGY: The species is named after the Republic of Colombia, in which we collected stingray helminths for two summers.

Table 1. Host-parasite list of elasmobranchs examined and cestodes collected in Colombia during 1975 and 1976. Numbers in parentheses represent numbers of hosts examined.

MYLIOBATIFORMES

Dasyatoidea

Dasyatidae

Dasyatis americana (1)

Phyllobothrium cf. *kingae*

Polypocephalus medusius (Linton, 1889) Woodland, 1930

Lecanicephalum peltatum Linton, 1890

Dasyatis guttata (10) negative

Himantura schmardae (12)

Acanthobothroides thorsoni Brooks, 1977

Acanthobothrium tasajerasi Brooks, 1977

Acanthobothrium himanturi Brooks, 1977

Rhinebothrium magniphallum Brooks, 1977

Rhinebothrium tetralobatum Brooks, 1977

Caulobothrium anacolum Brooks, 1977

Urolophidae

Urolophus jamaicensis (5)

Acanthobothrium cartagenensis sp.n.

Phyllobothrium cf. *kingae*

Rhinebothrium magniphallum Brooks, 1977

Urotrygon venezuelae (16)

Acanthobothrium urotrygoni sp.n.

Rhinebothrium magniphallum Brooks, 1977

Potamotrygonidae

Potamotrygon magdalenae (51)

Potamotrygonocestus magdalenensis Brooks and Thorson, 1976

Rhinebothrium moralarai Brooks and Thorson, 1976

Acanthobothrium quinonesi Mayes, Brooks, and Thorson, 1978

Potamotrygon circularis (6)

Potamotrygonocestus sp. Brooks, Mayes, and Thorson, in press

Rhinebothrium sp. Brooks, Mayes, and Thorson, in press

Acanthobothrium amazonensis Mayes, Brooks, and Thorson, 1978

Myliobatioidea

Myliobatidae

Aetabatis narinari (2)

Acanthobothrium colombianum sp.n.

TORPEDINIFORMES

Narcinidae

Narcine brasiliensis (17)

Acanthobothrium lintoni Goldstein, Henson, and Schlicht, 1969

Acanthobothrium electricolum Brooks and Mayes, 1978

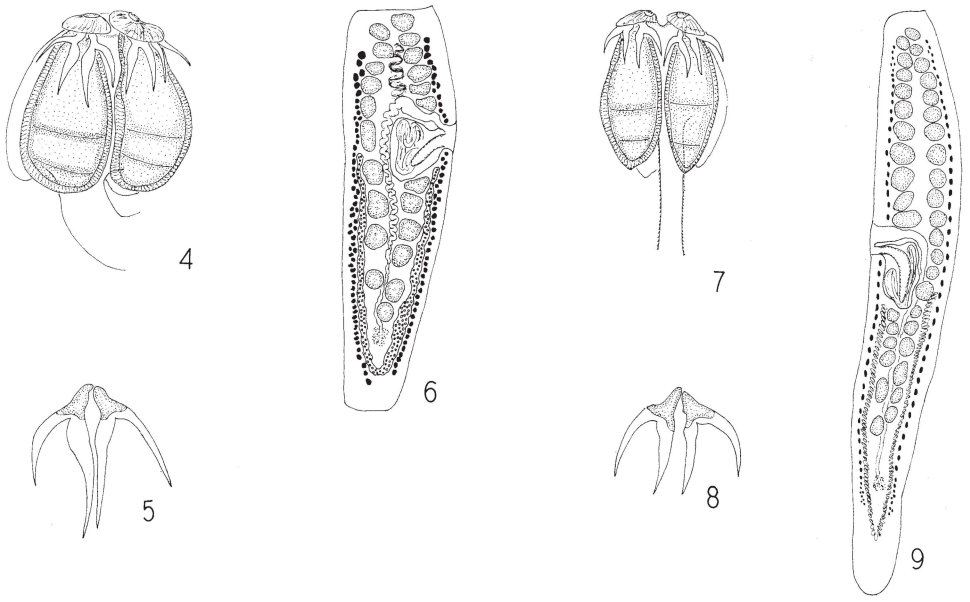
RHINOBATIFORMES

Rhinobatidae

Rhinobatus productus (1) negative

Remarks

Acanthobothrium colombianum most closely resembles *A. paulum* Linton, 1890 and *A. mathiasi* Euzet, 1956. *Acanthobothrium paulum* differs by having an ovary which is more follicular (less compact) than that of *A. colombianum*



Figures 4–9. 4–6. ***Acanthobothrium cartagenensis*****. 4. Scolex. 5. Bothridial hooks. 6. Mature proglottid. 7–9.** ***Acanthobothrium urotrygoni*****. 7. Scolex. 8. Bothridial hooks. 9. Mature proglottid. Scales for Figures 4, 6, 7, 9 = 400 μm; for Figures 5, 8 = 200 μm.**

and which possesses lobes extending to near the posterior margin of the cirrus sac, rather than being distinctly posterior to the cirrus sac. The new species differs from *A. mathiasi* by having an average of 46 rather than 35 testes per proglottid (26–43 for *A. mathiasi* and 39–53 for *A. colombianum*) and by having relatively less elongate bothridia (see Euzet, 1956). *Acanthobothrium colombianum* also possesses a pre-equatorial rather than postequatorial genital pore in contrast to both *A. paulum* and *A. mathiasi*; it resembles *A. paulum* and *A. mathiasi* by having similarly sized bothridial hooks, similar numbers of proglottids per strobila, and similarly sized cirrus sacs, and by exhibiting a scolex, at the end of a relatively long and spinose cephalic peduncle which is not expanded at its junction with the scolex, whose bothridia are not attached at their posterior ends by a velum.

Acanthobothrium urotrygoni sp.n.
(Figs. 7–9)

DESCRIPTION (based on 10 specimens): Strobila acraspedote, apolytic, composed of 4–6 proglottids, up to 15 mm long. Scolex 154–161 long by 161–173 wide, composed of 4 trilocular bothridia each armed with pair of bifid hooks and surmounted by apical sucker and pad. Bothridia 184–196 long by 61–69 wide; anterior loculus 58–81 long, middle loculus 23–34 long, posterior loculus 34–46 long. Average ratio of locular lengths 1:0.4:0.6 (N = 15). Apical pads 58–69 in diameter, suckers 23–35 in diameter. Hook formula for 28 hooks:

27–33 (30)	60–68 (65)	60–68 (65)
	87–101 (95)	

Cephalic peduncle 207–391 long, spinose; spines 3–7 long. Immature proglottids longer than wide. Mature proglottids 465–675 long by 72–173 wide. Genital pores alternating irregularly in anterior 34–43% ($\bar{x}$ = 38%, N = 15) of proglottid. Cirrus sac subspherical, 60–98 long by 60–83 wide, containing spined eversible cirrus. Testes in anterior ¾ of proglottid, 29–45 in diameter, 24–33 ($\bar{x}$ = 28.4, N = 20) in number; 7–10 (9) preporally, 4–5 (4) postporally, 11–19 (15) antiporally. Ovary V-shaped with poral lobe reaching posterior margin of cirrus sac and aporal lobe reaching lateral margin of cirrus sac; lobes 180–464 long by 45–68 wide at isthmus. Vitelline follicles 8–15 in diameter, extending in 2 lateral rows from level of ovarian isthmus to near anterior end of proglottid.

HOST: *Urotrygon venezuelae* Schultz.

SITE OF INFECTION: Spiral valve.

LOCALITY: Cartagena, Colombia.

HOLOTYPE: USNM Helm. Coll. No. 75162.

PARATYPES: USNM Helm. Coll. No. 75163; Univ. Nebraska State Museum, Manter Laboratory No. 20917.

ETYMOLOGY: This species is named for its host genus.

Remarks

By possessing a V-shaped ovary with arms reaching to the level of the cirrus sac, pre-equatorial genital pores, fewer than 60 testes per proglottid, and fewer than 35 proglottids per strobila, *A. urotrygoni* most closely resembles *A. lineatum* Campbell, 1969, *A. southwelli* Subhapradha, 1955, *A. brevissime* Linton, 1908, *A. tasajerasi* Brooks, 1977, *A. himanturi* Brooks, 1977, and *A. olseni* Dailey and Mudry, 1968. By having bothridial hooks only 87–101 μm long, the new species resembles *A. olseni* more than any of the others, but *A. olseni* possesses cirrus sacs which reach 168 μm in length, whereas those of *A. urotrygoni* do not exceed 90 μm. *Acanthobothrium southwelli* has cirrus sacs 80 μm long and *A. lineatum* has a long and spinose cephalic peduncle, but *A. southwelli* and *A. lineatum* differ from *A. urotrygoni* in bothridial hook and peduncle size and bothridial hook and cirrus sac size, respectively.

Acanthobothrium cartagenensis sp.n.
(Figs. 4–6)

DESCRIPTION (based on single complete specimen): Strobila apolytic, acraspedote, 25 mm long, composed of 13 proglottids. Scolex 300 long by 300 wide; composed of 4 trilocular bothridia, each armed with pair of bifid hooks and surmounted by apical sucker and pad. Bothridia 255 long by 150 wide; anterior loculus 100–130 long, middle loculus 37–40 long, posterior loculus 38–40 long. Ratio of locular lengths 1:0.3:0.3. Apical pads 67 in diameter, suckers 30 in diameter. Hook formula for 6 hooks:

33–35 (34)	69–75 (72)	90–98 (95)
	121–131 (127)	

Cephalic peduncle 180 long, spinose; spines 3–5 long. Neck expanded at juncture with scolex, 120 wide. Immature proglottids wider than long. Last 3 mature proglottids 360–660 long by 157–183 wide. Genital pores alternating irregularly in anterior 34–38% (35%) of proglottid. Cirrus sac spherical, 67–90 in diameter.

Testes in anterior ¾ of proglottid, 30–45 in diameter, 21–26 (24) in number; 4–6 preporally, 5–6 postporally, 10–14 antiporally. Ovary V-shaped, poral lobe extending anteriorly to posterior margin of cirrus sac, aporal lobe reaching anteriorly to lateral margin of cirrus sac; lobes 210–390 long by 60–112 wide at isthmus. Vitelline follicles 5–10 in diameter, extending in 2 lateral longitudinal rows from level of ovarian isthmus to near anterior end of proglottid.

HOST: *Urolophus jamaicensis* (Cuvier).

SITE OF INFECTION: Spiral valve.

LOCALITY: Cartagena, Colombia.

HOLOTYPE: USNM Helm. Coll. No. 75159.

ETYMOLOGY: This species is named after the city of Cartagena, where its host was collected.

Remarks

Acanthobothrium cartagenensis has a relatively short strobila, a short and spinose cephalic peduncle which is expanded at its juncture with the scolex, and relatively short and broad bothridia which are not attached to the scolex by a velum. In these respects, the new species most closely resembles *A. urolophi* Schmidt, 1973, *A. holorhini* Alexander, 1953, *A. quinonesi* Mayes, Brooks, and Thorson, 1978, *A. amazonensis* Mayes, Brooks, and Thorson, 1978, and *A. terezae* Rego and Dias, 1977. By having a V-shaped rather than H-shaped ovary, *A. cartagenensis* more closely resembles *A. urolophi* and *A. holorhini* than the other three, all of which parasitize South American freshwater stingrays. *Acanthobothrium holorhini* differs from the new species by possessing bothridial hooks up to 218 μm long rather than 123–131 μm, by having 63–80 rather than 13 proglottids per strobila, and by having 60–77 rather than 21–26 testes per proglottid. *Acanthobothrium urolophi,* the only other member of the genus known from hosts of the genus *Urolophus,* differs from *A. cartagenensis* by having cirrus sacs up to 200 μm long rather than 90 μm, 23–26 rather than 13 proglottids per strobila, bothridial hooks 105–115 μm long rather than 123–131 μm long, and equatorial rather than pre-equatorial genital pores.

***Rhinebothrium magniphallum* Brooks, 1977**

HOSTS: *Urolophus jamaicensis, Urotrygon venezuelae, Dasyatis americana, new hosts.*

SITE OF INFECTION: Spiral valve.

LOCALITY: Cartagena, Colombia, *new locality.*

SPECIMENS DEPOSITED: University of Nebraska State Museum, Manter Laboratory No. 20915 (*Urolophus*), 20914 (*Urotrygon*), 20928 (*Dasyatis*).

Remarks

Brooks (1977) described this species from the dasyatid ray *Himantura schmardae* (Werner) collected near Santa Marta, Colombia. This report extends the known range of *R. magniphallum* and expands the host specificity of the species to include four species representing four genera and two families (Dasyatidae and Urolophidae). We noted no differences in range or in mean number of bothridial loculi or testes in our specimens; thus, for *R. magniphallum* in natural infections, these characteristics are apparently not altered by host influence.

Phyllobothrium cf. *kingae* Schmidt, 1978

HOSTS: *Urolophus jamaicensis, Dasyatis americana.*
SITE OF INFECTION: Spiral valve.
LOCALITY: Cartagena, Colombia.
SPECIMENS DEPOSITED: University of Nebraska State Museum, Manter Laboratory No. 20926, 20927.

Remarks

The specimens to which the above refers more closely resemble *P. kingae* Schmidt, 1978 than any other species because they possess bothridia with marginal loculi and incomplete horizontal loculi (Schmidt, 1978). Our specimens differ from those of *P. kingae* in testes number and cirrus sac size, but we refrain from describing a new species because our specimens all possess bothridia which are too contracted for adequate characterization.

Polypocephalus medusius (Linton, 1889) Woodland, 1930

HOST: *Dasyatis americana, new host.*
SITE OF INFECTION: Spiral valve.
LOCALITY: Cartagena, Colombia, *new locality.*
SPECIMENS DEPOSITED: University of Nebraska State Museum, Manter Laboratory No. 20916.

Remarks

Linton (1889) described this species as *Parataenia medusia* from *Dasyatis centroura* (listed as *Trygon centroura*) collected at Woods Hole, Massachusetts. Woodland (1930) transferred the species to *Polypocephalus,* the senior synonym of *Parataenia.* Yamaguti (1959) reported *P. medusius* from *Dasyatis sayi* from Beaufort, North Carolina and Subhapradha (1955) reported this species from *Rhinobatus granulatus, R. schlegelli,* and *Rhynchobatis djeddensis* in Indian waters and presented detailed morphological accounts of his specimens.

Lecanicephalum peltatum Linton, 1890

HOST: *Dasyatis americana, new host.*
SITE OF INFECTION: Spiral valve.
LOCALITY: Cartagena, Colombia, *new locality.*
SPECIMENS DEPOSITED: University of Nebraska State Museum, Manter Laboratory No. 20937.

Remarks

Lecanicephalum peltatum was originally described from specimens in *Dasyatis centroura* at Woods Hole, Massachusetts (Linton, 1890). Subsequently, Southwell (1911) reported the species from Ceylon in *Trygon kuhli, Pteroplatea* (=*Gymnura*) *micrura,* and *Pristis cuspidatus.* Baer (1948) presented a detailed study of the morphology of this species based on specimens he collected from *D. centroura* in France.

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Editor's Note

Authors submitting manuscripts of a survey or taxonomic nature for publication in the Proceedings of the Helminthological Society of Washington are urged to deposit representative specimens in a recognized depository such as the National Parasite Collection at Beltsville, Maryland and include the accession numbers in the manuscript.